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PATENT APPLICATION
Mo6509
LeA 34,279

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION OF)	
CHRISTOPH SCHWEMLER ET AL)	
SERIAL NUMBER: 09/933,360)	GROUP ART UNIT: 1732
FILED: - August 20, 2001)	EXAMINER: Monica A. Fontaine
TITLE: - PROCESS FOR PRODUCING POLYCARBONATE AND PRODUCTS THEREFROM)	

LETTER

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Enclosed is an Appeal Brief in the matter of the subject Appeal. Please charge the fee for filing the Brief, \$500.00, to our Deposit Account Number 13-3848. Triplicate copies of this paper are enclosed.

Respectfully submitted,

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By

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an enveloped addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 November 4, 2005
Date

Aron Preis, Reg. No. 29,426
Name of applicant, assignee or Registered Representative

Signature

November 4, 2005
Date



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TITLE: PROCESS FOR PRODUCING POLYCARBONATE AND PRODUCTS THEREFROM)	

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Brief is an appeal from the Final Office Action dated May 19, 2005 in which the rejection of Claims 1, 2, 4 and 5 was maintained. An Advisory dated July 29, 2005 affirmed this rejection. A Notice of Appeal was filed on September 7, 2005.

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Aron Preis, Reg. No. 29,426
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Signature
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I. REAL PARTY IN INTEREST

This application is assigned to Bayer Aktiengesellschaft.

II. RELATED APPEALS AND INTERFERENCES

There are no pending appeals or interferences which Appellants are aware of that may be related to, would directly affect, would be affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

The application was filed with Claims 1-5. Claim 3 has been cancelled. Claims 1, 2, 4 and 5 are pending but stand rejected. Claims 1, 2, 4 and 5 are the subject claims of this appeal.

IV. STATUS OF AMENDMENTS

No amendments were filed after the final rejection of May 19, 2005.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The invention is directed to a process for making a shaped product, i.e. a molded article, of polycarbonate. Accordingly polycarbonate is produced by a conventional process (phase interface or melt transesterification) and in its molten state is introduced directly into an injection molding machine to form the shaped product. Importantly, the process is characterized in that it avoids the conventional granulation step.

VI. GROUNDS OF REJECTION TO BR REVIEWED ON APPEAL

1. Claims 1, 4 and 5 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,308,558 to Woldenberg et al. (herein Woldenberg)
2. Claim 2 has been rejected under 35 U.S.C. 103(a) as unpatentable over Woldenberg in view of U.S. Patent 6,265,533 to Regel et al (herein Regel).

VII. ARGUMENTS

CLAIMS 1, 4 AND 5 ARE NOT ANTICIPATED UNDER 35 U.S.C. 102(B) BY WOLDENBERG.

Polycarbonate resin, a well known engineering thermoplastic is produced by any of several industrial processes including phase interface and melt transesterification. In the production plant, the resin is worked-up to reduce the contents of impurities and undesirable by-products and is shipped in vacuum tight containers to the molder in the form of pellets (granules). The pellets are obtained by first extruding the polycarbonate into long narrow strands and cutting them to form pellets (granules). At the molder, the pellets melted and the melt injected to a mold cavity to form the shaped product. This conventional process is described in pages 194-195 of Chemistry and Physics of Polycarbonate by H. Schnell, InterScience Publishers, 1964, of record in the prosecution. (See enclosed copy which is identified in the Evidence Appendix.)

Accordingly the making of injection molded articles entails obtaining polycarbonate in pelletized (granular) form, melting the granules and injecting the molten mass into a mold cavity. At the completion of this conventional process the thermal history of the polycarbonate, beyond the polymerization stage, includes (1) melting of the resin to enable its granulation, and (2) melting the granules to enable the introduction of the resin into the mold cavity. The deteriorating quality of resin due to thermal exposure is a well known to the art-skilled.

Contrasting convention, the inventive process excludes granulation, and therefore avoids the thermal history entailed in (2). The resulting molded article features higher quality.

Woldenberg disclosed a process for foaming thermoplastic polycarbonate. Accordingly, polycarbonate is mixed with an aluminum compound and the resulting mixture is injection molded to produce a foamed article.

Nowhere disclosed in Woldenberg is the introduction of polycarbonate melt directly from its process of preparation to an injection molding machine, bypassing granulation. To the contrary, Woldenberg disclosed – column 6, lines 18 et seq. - that mixing of the polycarbonate and aluminum compound may be carried out at room temperature. The disclosure that mixing is carried out at room temperature mean that the polycarbonate is not directly introduced from the manufacturing to the molding stage. (That room temperature is not the same as the melt temperature of polycarbonate was shown in the course of prosecution).

In maintaining the rejection over Woldenberg (Advisory of July 29, 2005) the Examiner points to the phase interface process for producing polycarbonate and evidences a misunderstanding of the invention. Accordingly and for the record, phase interface process referred to in the present claims is identical to the one referred to in Woldenberg.

Further the Examiner points to Woldenberg for its disclosure (column 4, lines 30 et seq.) that “after addition of the usual additives, thermoplastic aromatic polycarbonates are mixed withAl₂O₃ (H₂O₃ (sic) and ... injection molded”.

Appellants submit that the quoted text refers to incorporating the “usual additives” the mixing of the resulting combination with alumina trihydrate and injection molding of the mixture. Since no detailed procedure for “addition of the usual additives” and for mixing it with the alumina trihydrate is set forth, there is no rational basis to read into the text anything but conventional steps. As discussed above, the conventional procedure for making compositions of polycarbonate entails granulating. There is nothing in the referenced text to describe or suggest avoiding pelletizing.

Appellants submit that Woldenberg falls short of anticipating the claims and the rejection thereover is untenable.

CLAIM 2 IS NOT RENDERED UNPATENTABLE OVER WOLDENBERG IN
VIEW OF REGEL.

Claim 2 is directed to an embodiment of the process wherein the polycarbonate melt is degassed.

Regel disclosed a process for increasing the molecular weight of polyesters by adding an organic phosphate to a processing apparatus and fusing the mixture to above the melting point, and where the apparatus has at least one vent zone to which under pressure is applied.

Woldenberg has been discussed above and its shortcoming in the present context noted.

There is nothing in Regel to augment Woldenberg in a presently meaningful manner.

The rejection of Claim 2 is respectfully submitted to be untenable.

In view of the preceding arguments, Appellants' respectfully submit that each of the Examiner's rejections is in error and respectfully request that the rejections be reversed. The allowance of Claims 1, 2, 4 and 5 is respectfully requested.

Respectfully submitted,

By



Aron Preis
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VIII. CLAIMS APPENDIX

The following is a listing of the claims on appeal.

Claim 1. A process for making a shaped product from thermoplastic polycarbonate comprising producing polycarbonate melt by a method selected from the group consisting of phase interface and melt transesterification and introducing the melt directly into a forming apparatus selected from the group consisting of an injection molding machine and an extruder, to form said shaped product, said process characterized in the absence therefrom of polycarbonate in granular form.

Claim 2. The process of Claim 1 characterized in that the polycarbonate melt is degassed.

Claim 4. The shaped product made by the process according to Claim 1.

Claim 5. In the process of forming a shaped product of a thermoplastic aromatic polycarbonate from melt obtained by a method selected from the group consisting of phase interface and melt transesterification, the improvement comprising avoiding granulating the polycarbonate before introducing the melt directly into a forming apparatus selected from the group consisting of an injection molding machine and an extruder to form said shaped product.

IX. EVIDENCE APPENDIX

The following evidence is submitted herewith:

Chemistry and Physics of Polycarbonates by H. Schnell, InterScience
Publishers, 1964, pages 194-195.

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CHEMISTRY AND PHYSICS OF POLYCARBONATES

By HERMANN SCHNELL

*Farbenfabriken Bayer A. G., Werk Uerdingen
Krefeld-Uerdingen,
Germany*

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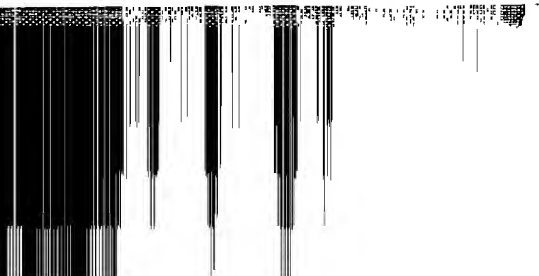
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Stretched and crystallized fibers, as well as film stretched in two perpendicular directions and crystallized, are in the development stage.

2. INJECTION-MOLDED PARTS, EXTRUDED TUBES AND SHAPES, AND BLOW-MOLDED ARTICLES

A. Injection Molding

The largest portion by far of the commercially produced bisphenol A polycarbonate is converted into parts and finished products by thermoplastic processing methods (19-31). Thermoplastic processing of the material utilizes the conventional equipment of the plastics industry, such as injection-molding machines and extruders.

Molding grade bisphenol A polycarbonates have average molecular weights (calculated from solution viscosity) between 32,000 and 35,000. The melt viscosities of higher molecular products exceed the limits of economical processing methods.

The temperature range available for processing extends from 240 to 330°C. In this range the polycarbonate will not suffer any noticeable degradation so long as it contains less than approximately 0.01% moisture (section V, 4). Excessive moisture causes chemical degradation as melt temperatures are reached, with bubbles forming in the molten material. Additives such as lead or zinc silicates, organic tin compounds, aryl tin oxides (32), or tertiary esters of phosphorous acid with aromatic hydroxy compounds, such as tris-2-*tert*-butyl-5-methyl-phenyl phosphite, have been suggested for stabilizing aromatic polycarbonates against degradation or discoloration at elevated temperatures (33).

The low moisture content necessary for thermoplastic processing is obtained by drying for about 8 hours at 120°C in a convection or vacuum oven. Since the dry polymer will rapidly absorb water from the air, it is recommended to keep it hot until it is transferred to the heated feed hopper of the processing unit.

Dry polycarbonate delivered in vacuum-tight containers is heated to about 110°C before breaking the seal in order to avoid moisture pick-up during handling and transfer.

Polycarbonate produced by the phosgenation process must be essentially free of chlorocarbonic acid ester groups. Methylene chloride used as a solvent also needs to have been removed down to very low residual values, since methylene chloride decomposes to form hydrochloric acid at the thermoplastic processing temperatures under the catalytic effect of metal surfaces. Hydrochloric acid resulting from the breakdown of

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Fig. VI-1

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chlorocarbonic acid ester end groups and methylene chloride causes corrosion of the processing equipment and the molds and is further capable of changing the character of certain dyes and pigments.

In the form of largely amorphous pellets obtained by extruding strands and subsequently cutting them bisphenol A polycarbonate can be processed on all commercial injection-molding machines designed to attain barrel temperatures of about 350°C. In order to prevent moisture absorption by the pellets during their residence time in the feed hopper, the cover is heated by means of radiation equipment. A heating capacity of about 3000 watt/m² is usually sufficient.

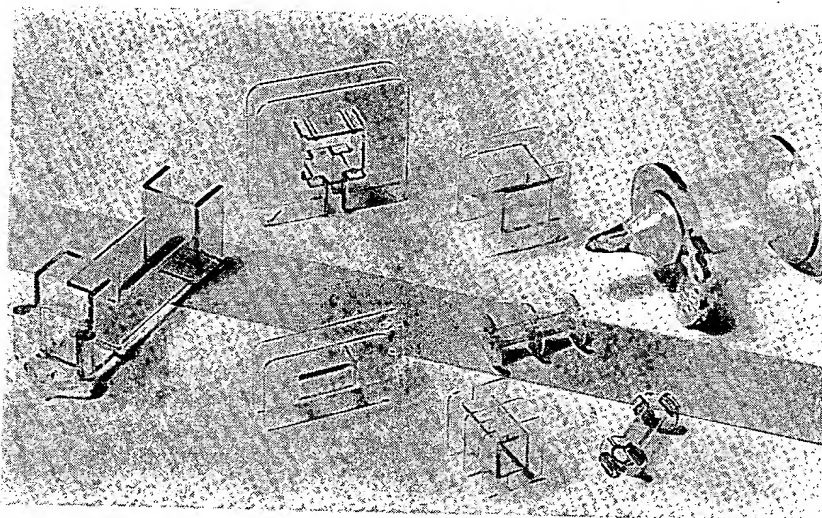


Fig. VI-1. Small components for the electrical industry injection-molded of bisphenol A polycarbonate.

For larger parts screw-injection-molding machines are required. High injection pressures, in the range of 700 to 2200 kg/cm², are necessitated by the high-melt viscosity of polycarbonate. Nozzles, whether of the open or the automatic shutoff type, must be heated, preferably to cylinder temperature.

Die designs must make allowance for the high-melt viscosity of polycarbonate by providing short sprues of ample cross-sectional area, making runners as short as possible, and keeping wall thickness above 0.7 mm. Molds should be heated to improve mold flow and reduce internal stresses

X. RELATED PROCEEDINGS APPENDIX

Appellants' have not identified any applications under Section II, titled "RELATED APPEALS AND INTERFERENCES". Accordingly, there is nothing to submit under this section.